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Multiple Nonradial Solutions for a Nonlinear Elliptic Radial Problem: an Improved Result

We obtain an improved version of a recent result concerning the existence of nonnegative nonradial solutions $u \in D^{1,2}(\mathbb{R}^N) \cap L^2(\mathbb{R}^N, |x|^{-\alpha}\, dx)$ to the equation

$$-\triangle u + \frac{A}{|x|^\alpha} u = f(u) \quad \text{in } \mathbb{R}^N, \quad N \geq 3, \quad A, \alpha > 0,$$

where f is a continuous nonlinearity satisfying $f(0) = 0$.

Keywords: Semilinear elliptic PDE, singular vanishing potential, symmetry breaking.

MSC: 35J60; 35Q55, 35J20.